and the subject is sufficiently clothed and fed, he will probably be able to accomplish a very much larger amount of mental work, without being over-strained, than would be the case if these conditions were neglected.

In Germany, the question of dealing with over brain work is probably more pressing than it is in this country, because the brain is often over-exercised, while there is an insufficiency of physical exercise. In England, I am afraid, it is more often a question of physical fatigue than one of mental strain with which we are faced. But of course, when the teaching system is "unintelligent"—that is, one of *cram*—the poor brain must get terribly wearied.

Mr. Sadler has compiled the report with great care, and the portions which he has himself written are marked by a refreshing breadth of view not always to be found in Government reports. It is probable, however, that the object would be better attained if these reports were more condensed. F. MOLLWO PERKIN.

TIDAL CURRENTS IN THE GULF OF ST. LAWRENCE.

FOR many years past, the Canadian Government has been prosecuting an accurate survey of the complicated tides and tidal currents of the Gulf of St. Lawrence. The Tidal Department, under the able directorship of Mr. W. Bell Dawson, has already done much excellent work in this field, although, doubtless, much yet remains to be discovered. In the tidal report for the present year, Mr. Dawson will describe the results of a careful analysis of the remarkable tidal currents which are met with in Northumberland Strait south of Prince Edward's Island. At most places, the times of the changes of tidal currents bear a more or less constant relationship to the times of high and low water, but in this channel the changes are found to be largely governed by the moon's declination. As Mr. Dawson remarks:—"This is very confusing to the mariner, as the turn of the current in relation to the tide is out of accord with the moon's phases, and has thus no fixed relation to the spring and neap tides. The greatest apparent irregularity is when the moon's declination is at its maximum; and this occurs sometimes at the spring tides and sometimes at the neaps. The ordinary navigator takes refuge in the conclusion that the currents are chiefly influenced by the wind."

Diurnal tides are ruled by the declination of the moon, and it would seem that there must be at this place a large diurnal inequality which manifests itself more by current than by variations of height.

Those who are interested in this subject will do well to refer to Mr. Dawson's forthcoming report.

G. H. D.

JOHANNES WISLICENUS.

THE generation that laid the foundation of organic chemistry has almost become a thing of the past, and at the close of last year one of the few remaining links was broken by the death of Wislicenus.

Not long since, the University of Leipzig was mourning the loss, at a venerable age, of a distinguished physicist; to-day the chair which was made famous by that "wahre Bearbeiter" Kolbe is vacant, and a name which will ever be illustrious in the history of spacial chemistry has been added to the classical traditions of this great seat of learning.

The news has come not as a sudden shock, for of late years the health of the venerable Geheimrath has been visibly declining, and waning strength and feeble gait warned his many friends that his working days would soon be over; none the less poignant, however, is the grief felt by all who have had the privilege of sharing his friendship or coming under the influence of his impressive and genial personality.

Johannes Wislicenus was born on June 24, 1835, at Klein-Eichsted, in the Prussian province of Saxony; when he was five years old, his father, a pastor, was transferred to Halle a. Salle, and there the boy received his first impressions of school life. At the "Frankesche Stiftung," a school which has since become celebrated, he remained until the age of eighteen, and at Easter, 1853, having passed his Maturitätsexamen, he entered the University of Halle with the intention of devoting himself to the study of natural science. His project was, however, soon frustrated. The political horizon was still clouded over, and in consequence of certain intrigues, his father, in the autumn of the same year, was compelled to fly the country; he found a home for himself and his family, as did so many refugees of that time, in the United States. In the following year, Johannes was appointed assistant to Prof. Horsford at Harvard University, Mass., and in 1855 became lecturer at the Mechanics' Institute, New York, with a laboratory at his disposal.

It was thus that he acquired that command of English which was such a source of wonder to his foreign students in later years.

In 1856, he was able to return to Europe, and resumed his interrupted studies at the University of Zurich, where he "promovierte" in 1860 and was appointed Privat-docent at the Polytechnic.

In 1861, he became professor of chemistry and mineralogy at the "Kantonale Industrieschule." Four years later, he received the honour of a chair at the University of Zurich, and in 1871 was elected by the "Bundesrath" as director of the Polytechnic in that town. In the following year, he was chosen to succeed Ad. Strecker at Würzburg. There he remained until 1885, and it was during this time that he carried on his classical researches on the constitution of acetoacetic ether and so established his reputation on a firm basis.

The year 1884 witnessed the death of Kolbe and the call of Wislicenus to Leipzig, where he remained until the end. As was pointed out by a writer recently in this Journal, "there is a curious irony in the thought that his first work there should have been directed towards the extension of the theory of Van 't Hoff, whom Kolbe had regarded with such contempt."

Of his scientific work, space will only permit the barest outline. His researches were confined almost exclusively to the domain of organic chemistry, most of them appearing in *Liebig's Annalen der Chemie*. The constitution of lactic acid, on which he worked from 1863 to 1872, establishing the identity of structure for the two different substances fermentation- and para-lactic acids, first brought him into prominence among chemical workers and impelled him to seek an explanation of the metamerism in the spacial relations of the atoms within the molecule. His interest in acetoacetic ether, to which reference has already been made, resulted in a detailed investigation of its reactions and of its value as a synthetic agent; these have gone far to stimulate the study of this most interesting compound, and are of importance, if for no other reason, for the light they throw on the still open question of its constitution.

It was in Leipzig, however, that he achieved his great work. In 1887 appeared his famous memoir, "Über die raümliche Anordnung der Atome in organischen Molekulen," to account for the phenomena of "geometrical isomerism." According to his hypothesis, which was an extension of that formulated independently by Le Bel and Van 't Hoff in 1874, "the centre of gravity of a carbon atom was regarded as situated in the centre of a tetrahedron, and its four affinities at the four corners." When two atoms were linked together, Van 't Hoff, and

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after him Wislicenus, assumed that both were capable of rotating in opposite directions about a common axis; this possibility ceased, however, with a double or treble linking of the carbon atoms. Wislicenus further called into play the action of certain "specially directed forces the affinity-energies" which "determine the relative positions of the atoms to one another in the molecule."

The *Annalen* of these years contain a large number of papers worked out in the Leipzig laboratories under his direction, in which the reactions of maleic and fumaric acids, the tolane dichlorides and dibromides, mesaconic and citraconic acids, the crotonic acids, the α-chloropropylenes, &c., were carefully investigated, and the facts shown to be in agreement with those demanded by theory.

The hypothesis naturally evoked much criticism; Wislicenus's controversy with Fittig (*Liebig's Annalen*, 1892, cclxxii. 1–99) is still fresh in the minds of chemists, and it must be admitted that Michael has obtained results which it has not yet been found possible to reconcile with the theory. But when all is said, there can be little doubt that up to the present it remains the simplest and most comprehensive explanation adduced. Even if the theory should ever be disproved, Wislicenus's memoir will always hold a place among the classics of the science as a model of careful reasoning and literary skill, and as an epitome of one of the most laborious researches of that period.

Now, however, is not the time, nor is this the place, to dwell in any detail on his scientific papers; the above indication of the direction which his research took must suffice; it would be presumptuous to attempt to estimate the value of his work; enough that, among the great names in the history of chemical science, Wislicenus will stand with Bunsen and Kekulé and Victor Meyer and such names as made the nineteenth century what it was.

We do not wish to enter into a panegyric of his character; such things belong rather to the columns of a daily paper and to the exaggerated estimates of mediocrities; but a word as to his human aspect—and he *was* a man of wide sympathies—will not be out of place. In politics, he was an ardent admirer of Bismarck, and had little tolerance for the social democrats of latter days; not that charitableness was lacking in his disposition, for many were the kindly acts that he performed. He was fond of children, and when his own family had grown up and he was left alone with his daughter, the cheerful presence of a little niece helped to relieve the gloom that the tragedy of his domestic life had cast over the later years. To music he was almost insensible, and Wagner was to him nothing more than a confusion of sounds. He was present at the first performance of "Siegfried," but left in the middle of the second act with a violent headache. Literature was his one refuge in the intervals of work, and when troubled with insomnia, from which he suffered much, he would pass the hours in his well-stocked library. It is related that at one of his weekly dinner parties, to which all his research students were invited in turn, a youth of an inquiring turn of mind, desirous of probing the extent of the professor's knowledge, read up an almost forgotten author and tackled him on the subject when the cigars were produced; great was the student's chagrin on discovering that it was one of his teacher's favourite authors and at having to sit through an impromptu half-hour's lecture on the author's peculiarities of style. This youth never carried his investigations any further. With his students, Wislicenus was always popular, and though they christened him at one time the "Schmier-Director," from the number of tarry residues that the arbeits were producing, that did not detract from the affection and esteem in which he was held. In his daily round of the research laboratories, he was ever ready with words of sympathy and encouragement that went far to allay the soreness and disappointment of repeated failures; his kindly suggestions have stimulated many to greater efforts.

In 1898, the Royal Society awarded him the Davy medal, and his death makes a vacancy in its list of foreign members.

The loss will be felt not in Germany alone, for his students came from all parts of the world, and while men of science will remember him as one of the founders of stereochemistry, his disciples will look back on him as one of the "influences" of their lives, as a man of broad sympathies and great powers, as an example to emulate and as a memory to inspire.

NOTES.

Among the names included in the long list of "Durbar Honours" published on New Year's Day, we notice the following:—Dr. George Watt, C.I.E., officer in charge of the Economic and Art Section of the Indian Museum, Calcutta, has had the honour of knighthood conferred upon him. Dr. W. R. Hooper, C.S.I., President of the Medical Board at the India Office, and Sir Colin Campbell Scott Moncrieff, K.C.M.G., President of the Indian Irrigation Commission, have been made Knight Commanders of the Star of India. Colonel St. George C. Gore, Surveyor-General of India, has been made a Companion of the same order. Dr. B. Franklin, Director-General Indian Medical Service, and Mr. John Eliot, F.R.S., Meteorological Reporter to the Government of India and Director-General of Indian Observatories, have been promoted to the rank of Knight Commanders of the Order of the Indian Empire. Major A. W. Alcock, F.R.S., Superintendent of the Indian Museum, and Prof. J. C. Bose, Presidency College, Calcutta, have been made Companions of the same order. Major David Semple, Director of the Pasteur Institute, Kasauli, has been awarded the Kaisar-I-Hind Medal for Public Service in India.

A German newspaper records the following exemplary incident, apropos of a recent act of the Kaiser, in appealing to his people for support in a good work. Dr. Dohrn, of Naples, having appealed with little result to the German Minister of Education for financial aid in the extension of his world-famed biological station, sought an interview with the Kaiser. Remarking sympathetically that he could not provide all that Dr. Dohrn desired from his private purse, the Kaiser furnished him with a donation form, headed by himself and a contribution of 1000*l.*, commanding that it should be circulated among the leaders in Berlin society, for return to the Kaiser in person. The result was that within a few days the magnificent sum of 15,000*l.* was subscribed.

Mr. Herbert Kynaston has been appointed by the Colonial Office director of the Geological Survey of the Transvaal.

M. Edmond Perrier has been appointed to the chair of comparative anatomy at the Paris Muséum d'Histoire Naturelle, and M. Pierre Marcellin Boule to the chair of palæontology at the same institution.

A message from the *Times* correspondent at Ottawa states that the promoters of the Canadian Marconi Company hope by the end of next summer to have a complete system of wireless telegraphy in operation throughout Canada, extending from the Gulf of St. Lawrence to the Pacific Coast.

Mr. Marconi was entertained at a banquet at Sydney on December 30 by the citizens of Cape Breton Island. Reuter reports that in responding to the toast of his health, Mr. Marconi said that when his system of wireless telegraphy was further developed, it would be possible for ships in distress to signal passing ships. The cable companies, when they began, charged pounds per word; they were now down to shillings,

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